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(54) **AUTOMATED HOPPER AND APRON CONTROL SYSTEM ON A PAVING MACHINE**

(71) Applicant: **Caterpillar Paving Products Inc.**, Brooklyn Park, MN (US)

(72) Inventors: **Bradley D. Anderson**, Rogers, MN (US); **Chad M. Thiesse**, Brooklyn Park, MN (US); **Toby Frelich**, Saint Michael, MN (US)

(73) Assignee: **Caterpillar Paving Products Inc.**, Brooklyn Park, MN (US)

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(52) **U.S. Cl.**
CPC ***E01C 19/48*** (2013.01)

(58) **Field of Classification Search**
CPC E01C 19/48
USPC 404/101, 108, 118; 298/24–31
See application file for complete search history.

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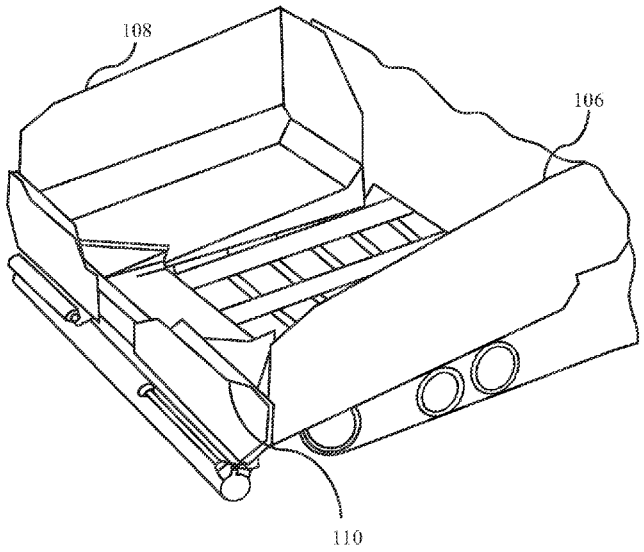
Primary Examiner — Raymond W Addie
(74) *Attorney, Agent, or Firm* — Andrew A. Phillips

(57) **ABSTRACT**

A paving machine including a right hopper, a left hopper, an apron and an automated hopper and apron control system is provided. The right hopper, the left hopper and the apron are configured to move in a vertically upward and downward direction. The automated hopper and apron control system is configured to control the movement of one or more of the right hopper, the left hopper, and the apron. The automated hopper and apron control system may include a controller. The controller is configured to operate the automated hopper and apron control system in a manual mode and an auto mode as desired by an operator. In the auto mode, the controller actuates one or more of the right hopper, the left hopper, and the apron from a first position to one of a fully raised position and a fully lowered position.

20 Claims, 4 Drawing Sheets



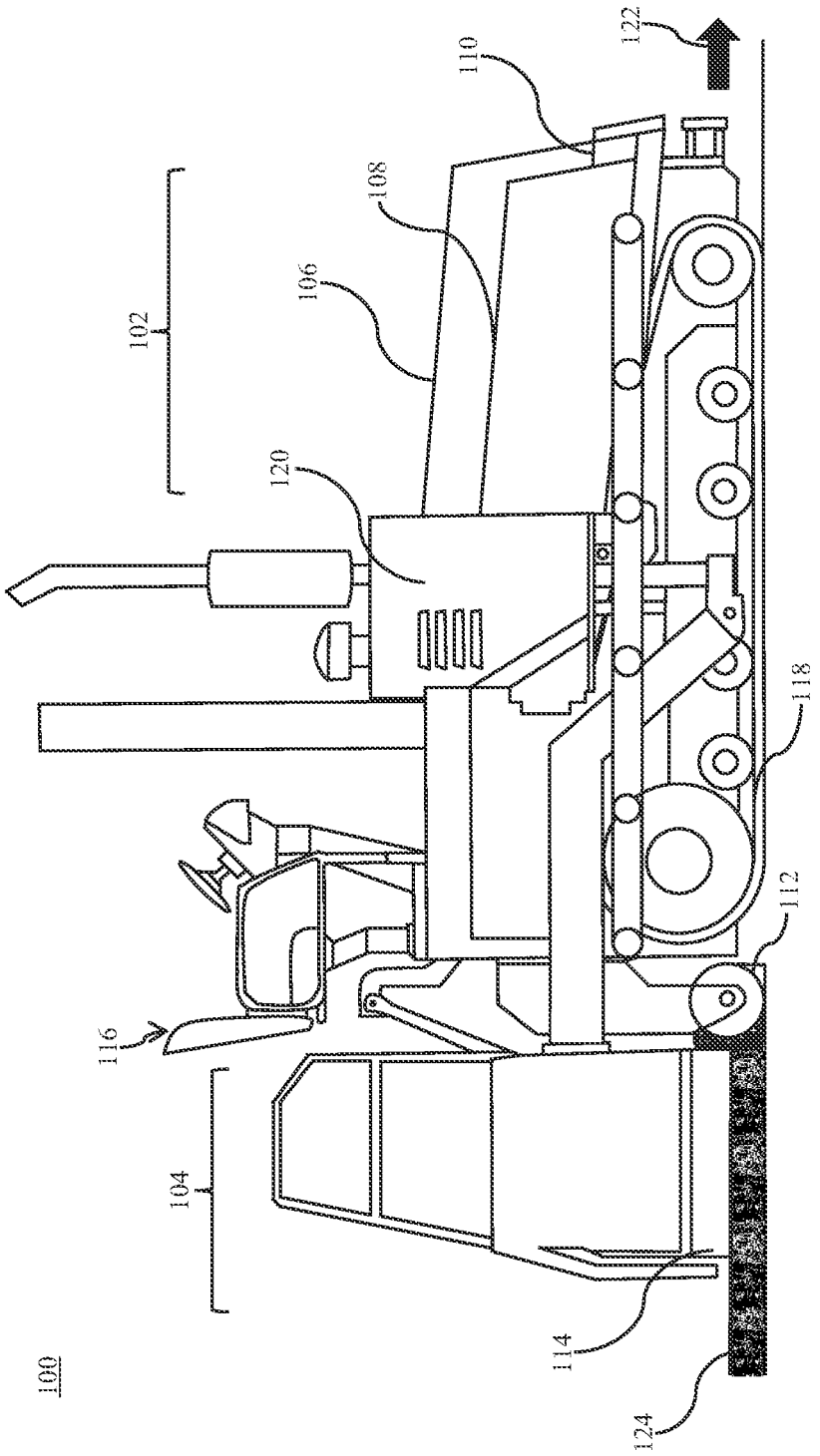


Fig. 1

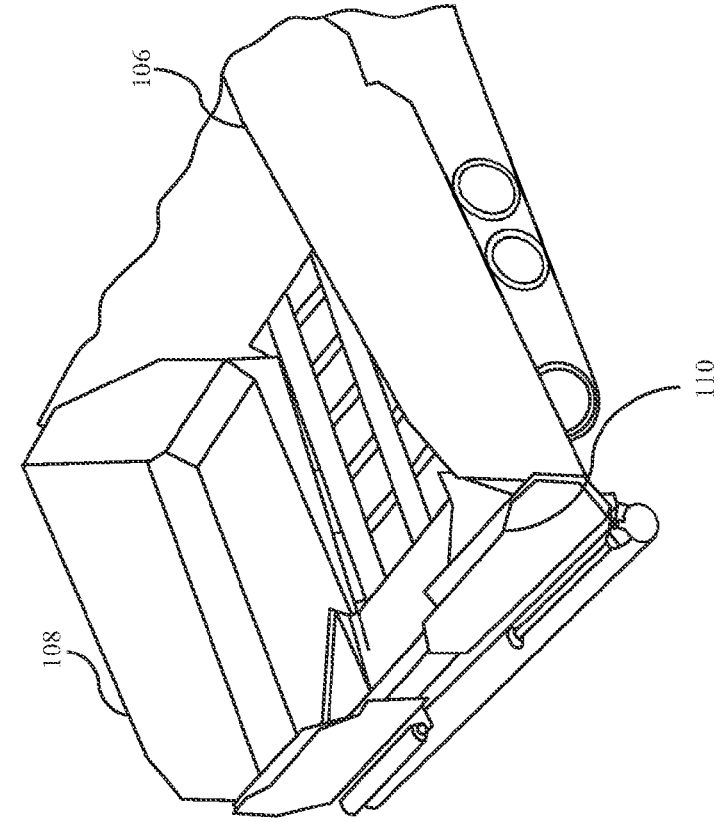


Fig. 3

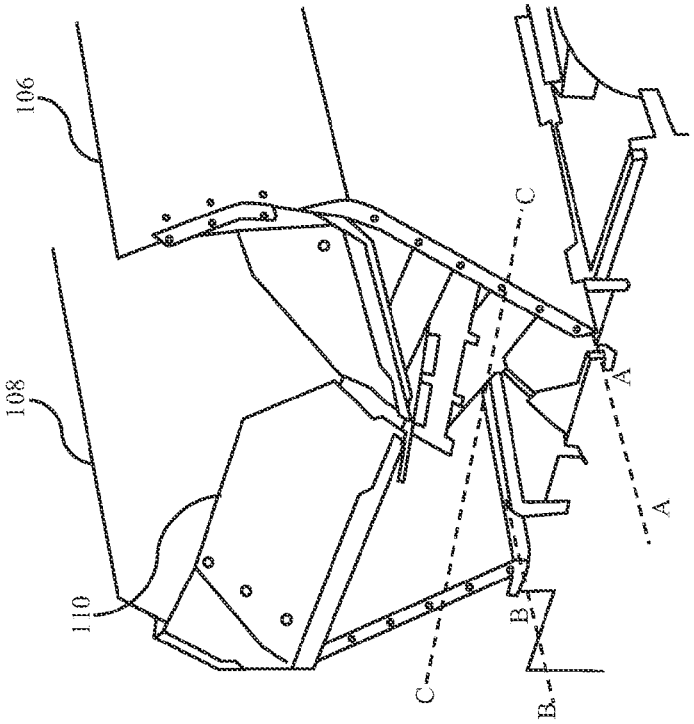


Fig. 2

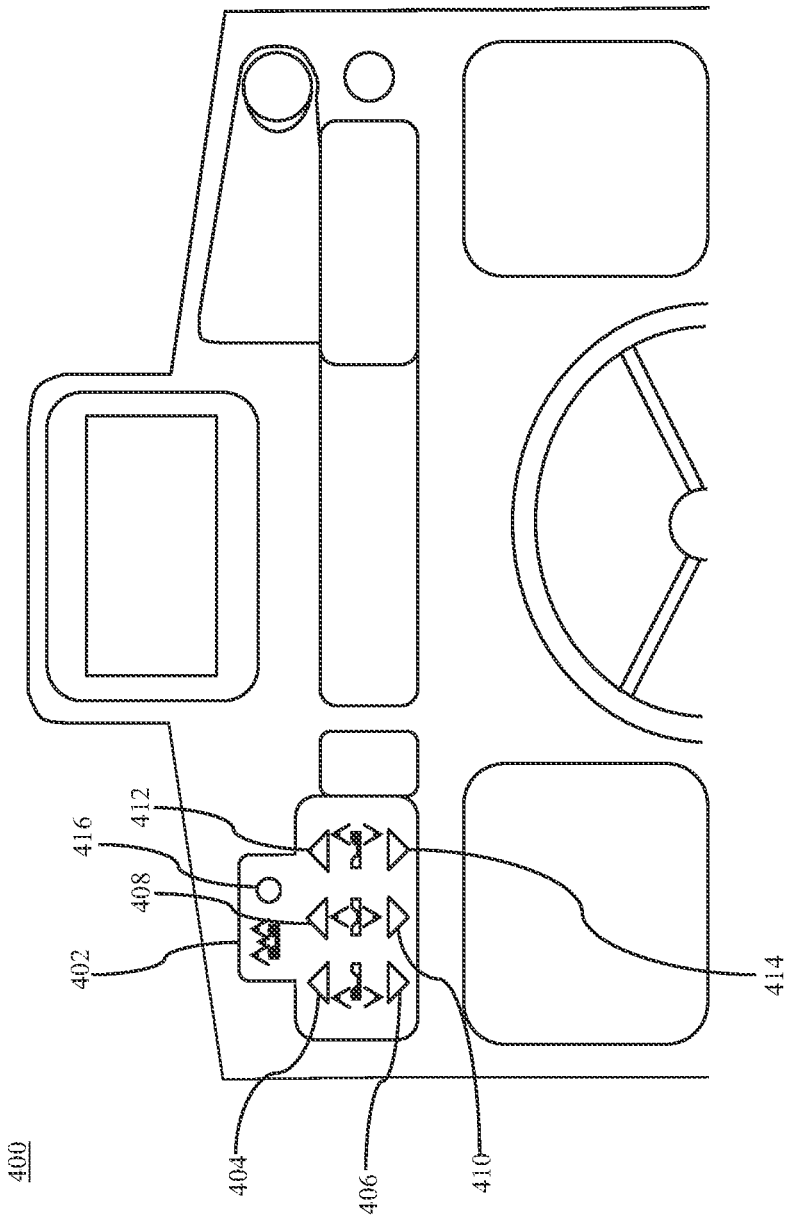


Fig. 4

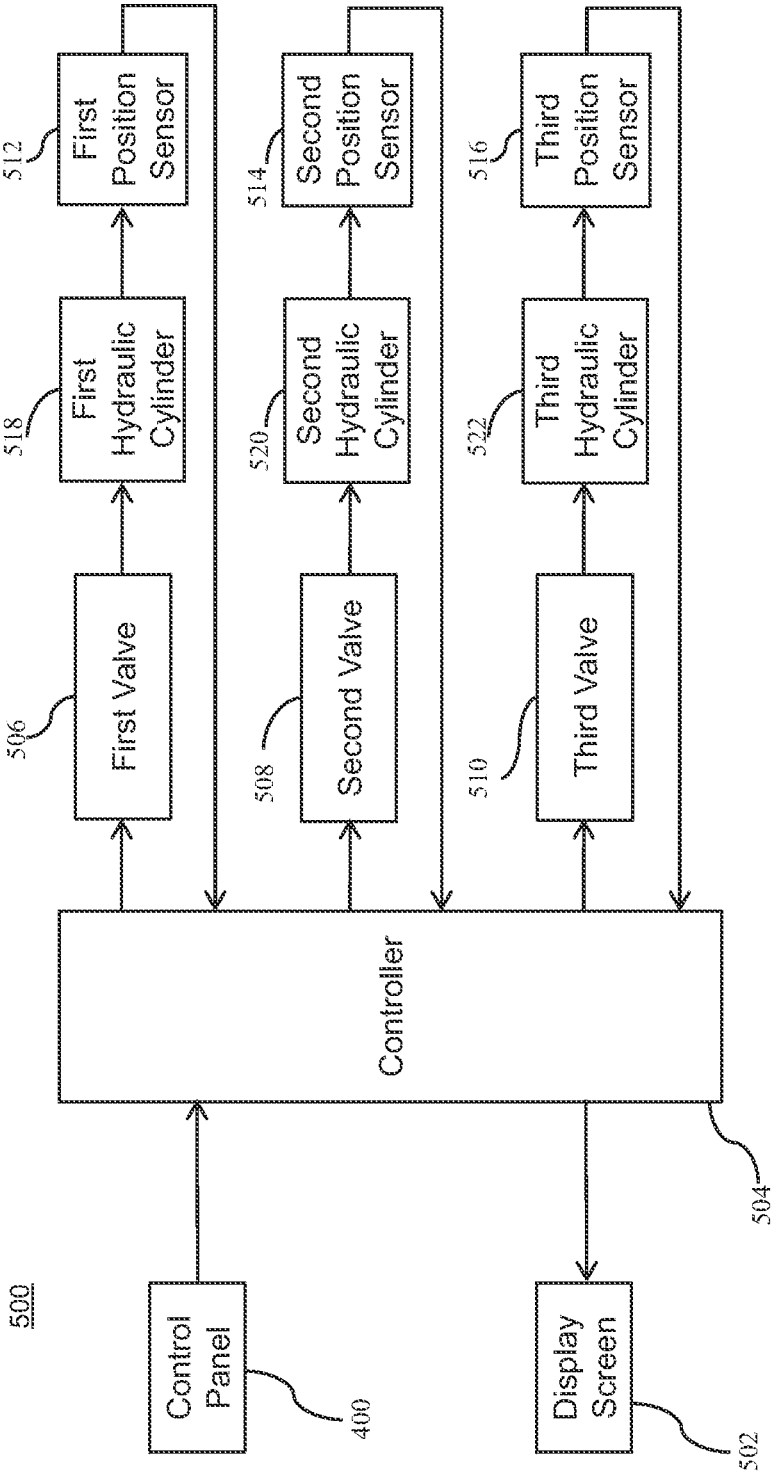

500
Control Panel
400
Display Screen
502
Controller
504
First Valve
506
Second Valve
508
Third Valve
510
First Hydraulic Cylinder
518
Second Hydraulic Cylinder
520
Third Hydraulic Cylinder
522
First Position Sensor
512
Second Position Sensor
514
Third Position Sensor
516

Fig. 5

AUTOMATED HOPPER AND APRON CONTROL SYSTEM ON A PAVING MACHINE

TECHNICAL FIELD

The present disclosure relates to paving machines, more particularly to an automated hopper and apron control system on a paving machine.

BACKGROUND

Road construction equipment, such as paving machines, are used for constructing road surfaces by laying leveling and preliminarily compacting paving material such as asphalt. The paving material is added to the hoppers of a paving machine by a dump truck. The material is transferred from the hoppers to a hopper conveyor of the paving machine. The hoppers and apron are raised or lowered to gravity feed an optimum pile of the paving material over the hopper conveyor. The material from the hopper conveyor is conveyed to a distributing auger on a rear end of the paving machine. The distributing auger lays the material on a paving surface as a stockpile. As the paving machine moves forward, the stockpile is flattened by a screed mounted on the rear end of the paving machine. The screed compacts the material over the width of the paving surface. For a smooth paved surface, there is a need for constant speed and consistent supply of the material to the hopper conveyor. Hence, the hopper and the apron needs to be raised and lowered to maintain consistent supply of the paving material for hopper conveyor. The hoppers and apron are controlled by a control system for an up/down movement.

Traditionally, the control system includes a keypad or control panel which has a plurality of keys or buttons or switch to control the up/down movement of the hoppers and the apron. There are buttons corresponding to the up/down movements of the hoppers and the apron. An operator initiates a process of emptying the material from the hoppers and/or apron by pressing the corresponding buttons. The operator holds the buttons throughout the process of emptying the material from the hoppers and the apron, or returning the hoppers and the apron to their starting position. As the operator holds the buttons, the control system actuates the corresponding functions for which the buttons are pressed. Such a control system is exhausting, less ergonomic and tedious for the operator as the operator needs to hold one or more of the buttons of the keypad, throughout the emptying process or while returning them to their starting position. Hence, there is a need for a control system that may enable the operator to work in a productive manner with better ergonomics.

SUMMARY OF THE DISCLOSURE

It is an object of the disclosure to provide a paving machine with an automated hopper and apron control system.

In accordance with the embodiments of the present disclosure, a paving machine may include a right hopper, a left hopper, an apron and an automated hopper and apron control system. The right hopper is configured to move in a vertically upward direction and a vertically downward direction. The left hopper is configured to move in the vertically upward direction and the vertically downward direction. Similarly, the apron is configured to move in the vertically upward direction and the vertically downward direction.

In accordance with the embodiments of the present disclosure, the paving machine may include the automated hopper and apron control system configured to control the movement of the one or more of the right hopper, the left hopper, and the apron. The automated hopper and apron control system may include a controller. The controller is configured to operate the automated hopper and apron control system in a manual mode and an auto mode as desired by an operator. In the auto mode, the controller actuates the one or more of the right hopper, the left hopper, and the apron from a first position to one of a fully raised position and a fully lowered position based on operator input. In the manual mode, the controller actuates the one or more of the right hopper, the left hopper, and the apron from the first position to a second position based on the operator input.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of a paving machine in accordance with an embodiment of the present disclosure;

FIG. **2** is a perspective view of a front end of the paving machine showing a right hopper, a left hopper, and an apron in a fully raised position in accordance with an embodiment of the present disclosure;

FIG. **3** is a perspective view of the front end of the paving machine showing the right hopper, the left hopper, and the apron in a fully lowered position in accordance with an embodiment of the present disclosure;

FIG. **4** is a diagrammatic illustration of a control panel with a keypad in accordance with an embodiment of the present disclosure; and

FIG. **5** is a block diagram illustrating a hopper and apron control system in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

FIG. **1** is a side view of a paving machine **100** in accordance with an embodiment of the present disclosure. As shown in FIG. **1**, the paving machine **100** includes a front end **102** and a rear end **104**. The front end **102** of paving machine **100** includes a right hopper **106**, a left hopper **108**, an apron **110**, and a hopper conveyor (not shown). The right hopper **106** and the left hopper **108** are configured to receive asphalt or other material from a dump truck or other material transfer vehicle. The right hopper **106**, the left hopper **108**, and the apron **110** are configured to move vertically upward and downward. In other words, the right hopper **106**, the left hopper **108**, and the apron **110** are hinged and can rotate about an axis while moving upward or downward. The movement of the right hopper **106**, the left hopper **108**, and the apron **110** is further described in FIG. **2**. Hence, the right hopper **106**, the left hopper **108**, and the apron **110** are arranged and aligned to gravity feed the material to the hopper conveyor (not shown).

The rear end **104** includes a distributing auger **112** and a screed **114**. The distributing auger **112** is configured to lay paving material on a paving surface as a stockpile. The stockpile is compacted by an action of the screed **114**.

The paving machine **100** further includes an operator station **116** and a track drive **118** driven by an engine **120**. In an alternative embodiment of the present disclosure, the paving machine **100** may include a wheeled drive, a track drive or the like. The operator station **116** houses controls for the paving machine **100** and the track drive **118**. The track drive **118** is configured to move the paving machine **100** during a paving operation in a paving direction indicated by an arrow **122**.

In operation, the paving material is dumped from a dump truck in a space created between the right hopper **106**, the left hopper **108** and the apron **110**. The paving material dumped in the right hopper **106** and the left hopper **108** is received by the

hopper conveyor (not shown) mounted under the right hopper **106** and the left hopper **108**. The hopper conveyor (not shown) conveys the material through a conveyor tunnel (not shown) to the distributing auger **112** located near the rear end **104** of the paving machine **100**. The distributing auger **112** is configured to distribute the material received from the right hopper **106** and the left hopper **108** via the hopper conveyor (not shown). The distributing auger **112** distributes the material across the width of a paving surface. The material laid on the paving surface is paved by the screed **114** attached to the rear end **104** of the paving machine **100**. The screed **114** is configured to float over the paving surface and flatten the material on the paving surface to form a mat **124**.

FIG. **2** is a perspective view of the front end **102** of the paving machine **100** showing the right hopper **106**, the left hopper **108**, and the apron **110** in a fully raised position in accordance with an embodiment of the present disclosure. The fully raised position of the right hopper **106**, left hopper **108**, and the apron **110** is referred to an upward position at a predefined height attained by a vertical upward movement of the right hopper **106**, left hopper **108**, and the apron **110**, respectively. As illustrated in FIG. **2**, the right hopper **106** can be hinged and rotate about the axis A-A. Similarly, the left hopper **108** and the apron **110** can be hinged and rotate about the axis B-B and C-C, respectively. Hence, the right hopper **106** can be moved vertically upward to a fully raised position by rotating the right hopper **106** about the axis A-A. In a similar manner to achieve fully raised position for the left hopper **108** and the apron **110**, each can be moved vertically upward by rotating the left hopper **108** and the apron **110** about the axis B-B and axis C-C, respectively. The rotation of the right hopper **106**, the left hopper **108** and the apron **110** can be hereinafter referred to as vertically upward movement or downward movement. It can be contemplated that suitable hydraulic or telescopic cylinders can be used to cause the vertically upward or vertically downward movement of the right hopper **106**, the left hopper **108** and the apron **110**.

FIG. **3** is a perspective view of the front end **102** of the paving machine **100** showing a right hopper **106**, a left hopper **108**, and an apron **110** in a fully lowered position in accordance with an embodiment of the present disclosure. The fully lowered position of the right hopper **106**, left hopper **108**, and the apron **110** is referred to a downward position at a predefined height attained by a vertical downward movement of the right hopper **106**, left hopper **108**, and the apron **110**, respectively.

FIG. **4** is a diagrammatic illustration of a control panel **400** on the paving machine **100** in accordance with an embodiment of the present disclosure. The control panel **400** is explained in conjunction with FIG. **1**.

The control panel **400** may include a keypad **402**. The keypad **402** may include a first button **404**, a second button **406**, a third button **408**, a fourth button **410**, a fifth button **412**, a sixth button **414** and a seventh button **416**.

The first button **404** may be configured to activate a vertically upward movement of the right hopper **106**. The second button **406** may be configured to activate a vertically downward movement of the right hopper **106**. The third button **408** may be configured to activate the vertically upward movement of the left hopper **108**. The fourth button **410** may be configured to activate the vertically downward movement of the left hopper **108**. The fifth button **412** may be configured to enable the vertically upward movement of the apron **110**. The sixth button **414** may be configured to enable the vertically downward movement of the apron **110**. The seventh button **416** may be configured to set a hopper and apron control system (shown in FIG. **5**) in an auto mode.

In an exemplary embodiment of the present disclosure each of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** on the keypad **402** may have a home position, a first control position and a second control position. When one or more of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** are set to the first control position, the hopper and apron control system may actuate corresponding functions in the manual mode. When the one or more of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** are set at the second control position the hopper and apron control system may actuate corresponding functions in auto mode.

It can be contemplated that the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** can be a rotary switch, a toggle switch, a radio dial, push button and the like. In an embodiment, the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** can be a push button. It can be implied that the push button can be depressed to a first depth to set the push button at the first control position, and the push button can be depressed further to a second depth, beyond the first depth, to set the push button at the second control position.

In an alternative embodiment of the present disclosure, the control panel **400** may have a touchpad with a one or more touch buttons for different functions.

FIG. **5** is a block diagram illustrating an automated hopper and apron control system **500** in accordance with an exemplary embodiment of the present disclosure. The automated hopper and apron control system **500** is herein after referred to as the control system **500**.

The control system **500** may include the control panel **400**, a display screen **502**, a controller **504**, a first valve **506**, a second valve **508**, and a third valve **510**. The control system **500** may also include a first position sensor **512**, a second position sensor **514**, and a third position sensor **516** mounted on a first hydraulic cylinder **518**, a second hydraulic cylinder **520**, and a third hydraulic cylinder **522**, respectively. In an embodiment of the present disclosure, the first position sensor **512**, the second position sensor **514**, and the third position sensor **516** can be configured to sense the retracted or extended position of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522**, respectively.

The keypad **402** on the control panel **400** may be configured to actuate one or more of the right hopper **106**, the left hopper **108** and the apron **110** according to an input provided by an operator. For example, the keypad **402** on the control panel **400** may actuate raising, lowering, extending, retracting or pivoting of the right hopper **106**, the left hopper **108**, and the apron **110** according to the input provided by the operator.

The control panel **400** may be configured to communicate with the display screen **502**. The display screen **502** may be configured to display information based on height and slope of the right hopper **106**, the left hopper **108** and the apron **110**. The controller **504** may be configured to receive data related to height and slope of the right hopper **106**, the left hopper **108** and the apron **110** from the one or more of the first position sensor **512**, the second position sensor **514**, and the third position sensor **516**. In other words, the data related to the height and slope of the right hopper **106**, the left hopper **108** and the apron **110**, respectively, may be extracted based on

positions of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522**, respectively. The data of the positions of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522** may be extracted through the first position sensor **512**, the second position sensor **514**, and the third position sensor **516**, respectively.

The first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522** may be actuated by a flow of a hydraulic fluid controlled by the first valve **506**, the second valve **508**, and the third valve **510**, respectively. The flow of the hydraulic fluid in and out of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522** may cause expansion and contraction of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522**, respectively. The expansion and retraction of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522** may cause movement of the right hopper **106**, left hopper **108** and the apron **110**, respectively.

In operation, an operator of the paving machine **100** with automated hopper and apron control system **500** may select to operate in manual or auto mode. In the manual mode, the operator of the paving machine **100** may actuate the right hopper **106** and the left hopper **108** from a first position to a second position in a vertical direction. The first position is referred to a position which may be the fully raised position, a fully lowered position, or between the fully raised position and the fully lowered position. The second position is referred to a desired position which may be vertically above or vertically below the first position, and may be the fully raised position, a fully lowered position, or between the fully raised position and the fully lowered position. For example, each of the right hopper **106** and the left hopper **108** are at the first position and the operator desires to actuate each of the right hopper **106** and the left hopper **108** from the first position to the second position. Here, the first position is referred to a position between the fully raised position and the fully lowered position and the second position refers to another position which is vertically above the first position and is short of the fully raised position. Prior to raising the right hopper **106** and the left hopper **108** from the first position, the operator may extract information on the current height at the first position of each of the right hopper **106** and the left hopper **108** from the display screen **502**. Based on the information, the operator may depress the first button **404** and the third button **408** to a first control position to change the height of the right hopper **106** and the left hopper **108**. During the vertically upward movement of each of the right hopper **106** and the left hopper **108**, the operator continues to hold the first button **404** and the third button **408** at first control position till each of the right hopper **106** and the left hopper **108** attain the second position. The operator may release the first button **404** and the third button **408**, when each of the right hopper **106** and the left hopper **108** attain the second position. In other words the operator may desire to raise or lower the right hopper **106**, the left hopper **108**, and the apron **110** to a desired height which may be mid way between the fully lowered position and the fully raised position. Hence, the operator is required to depress and hold both the first button **404** and the third button **408** at the first control position, till the time the desired height is achieved.

Further, the control system **500** may operate in an auto mode in accordance with an embodiment of the present disclosure. In an embodiment of the present disclosure the operator may activate the auto mode by pressing the seventh button **416** on the keypad **402** of the control panel **400**. In another embodiment of the present disclosure, the operator may activate the auto mode by depressing one or more of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** to a second control position for a predefined period of time. In another embodiment of the present disclosure, the auto mode may be activated by depressing at least two buttons of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** beyond the first control point for a predefined period of time. In other words, the auto mode can be activated by depressing the seventh button **416** or by depressing any one or more of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** to a second control position for a predefined period of time. A person skilled in the art would appreciate that the auto mode of the control system **500** may be activated by any other method without deviating from scope of the present disclosure.

In the auto mode, the vertically upward movement of the right hopper **106**, the left hopper **108** and the apron **110** may be actuated by pressing the first button **404**, the third button **408**, and the fifth button **412**, respectively. Similarly, the vertically downward movement of the right hopper **106**, the left hopper **108** and the apron **110** may be actuated by pressing the second button **406**, the fourth button **410**, and the sixth button **414**, respectively.

When the auto mode of the paving control system **500** is actuated, the control system **500** may keep operating until one or more of the right hopper **106**, left hopper **108**, and the apron **110** attain the fully raised position (as shown in FIG. **2**) or the fully lowered position (as shown in FIG. **3**), depending on input of the operator. In an embodiment of the present disclosure, the fully raised position and the fully lowered position of each of the right hopper **106**, left hopper **108**, and the apron **110** may be determined based on the data extracted from the first position sensor **512**, the second position sensor **514**, and the third position sensor **516**, respectively. In an exemplary embodiment, the controller **504** may also actuate one or more of the first hydraulic cylinder **518**, the second hydraulic cylinder **520**, and the third hydraulic cylinder **522** for a predefined time interval such that the right hopper **106**, the left hopper **108** and the apron **110**, respectively, reach a fully lowered or fully raised position. The fully raised position and the fully lowered position of each of the right hopper **106**, left hopper **108**, and the apron **110** may be determined by various alternative ways.

In an embodiment of the present disclosure, the operator of the paving machine **100** may desire to adjust the height of the right hopper **106** and the left hopper **108** when at the first position between the fully raised position and the fully lowered position. The operator may press the seventh button **416** to activate the auto mode. Further, the operator may desire to move each of the right hopper **106** and the left hopper **108** from the first position to the fully raised position. The operator may actuate the right hopper **106** and the left hopper **108** in vertically upward direction by pressing the first button **404** and the third button **408**, to a second control position and thereafter release first button **404** and the third button **408**, respectively. Thereafter, control signals are sent to the controller **504** for actuation of the right hopper **106** and the left hopper **108**. The controller **504** receives the control signals and generates command signals. The controller **504** sends the command signals to the first valve **506** and the second valve **508**. The first valve **506** and the second valve **508** in response to the received command signals, may actuate the flow of a hydraulic fluid to the first hydraulic cylinder **518** and the

second hydraulic cylinder **520**, respectively. The flow of the hydraulic fluid extends the first hydraulic cylinder **518** and the second hydraulic cylinder **520**. The extension of the first hydraulic cylinder **518** and the second hydraulic cylinder **520** moves the right hopper **106** and the left hopper **108** in the vertically upward direction from the first position to the fully raised position. Subsequently, the right hopper **106** and the left hopper **108** are in the fully raised position (as shown in FIG. **2**). In the meanwhile, the first position sensor **512** and the second position sensor **514** sends the data related to the heights of the right hopper **106** and the left hopper **108**, respectively, to the controller **504**. Based on the data received by the controller **504**, the controller **504** controls the display screen **502** to display the height of the right hopper **106** and the left hopper **108**.

Further, the operator may desire to disable the auto mode of the paving control system **500** in the middle of an ongoing or active operation. For example, while operating, the operator may command to fully raise the right hopper **106**. During the upward movement of the right hopper **106**, the operator may desire to stop the further movement of the right hopper **106**. In such a case, the operator may press the seventh button **416** to disable the auto mode. In another embodiment, the operator may depress the first button **404** to disable the auto mode. In this embodiment, the upward movement of the right hopper **106** may stop when the operator depressed the first button **404** or the seventh button **416**. In other words, the auto mode may be disabled by depressing the seventh button **416** or by depressing one or more of the first button **404**, the second button **406**, the third button **408**, the fourth button **410**, the fifth button **412**, and the sixth button **414** for a corresponding active upward or downward movement.

INDUSTRIAL APPLICABILITY

The disclosed paving machine **100** can be used in construction of driveways and roadways. The paving machine **100** may be used to serve purpose of leveling, compacting, spreading, and flattening of the material such as asphalt, on paving surfaces. The material may be dumped by a material dumping vehicle in the right hopper **106** and the left hopper **108** and the apron **110**. In the given embodiments of the disclosure, the paving machine **100** may include the control system **500**.

The disclosed control system **500** may operate in an auto mode or a manual mode. As set forth by an example, in an auto mode, the operator may be required to depress one or more of the a first button **404**, a second button **406**, a third button **408**, a fourth button **410**, a fifth button **412**, a sixth button **414** to raise or lower the right hopper **106**, the left hopper **108** and the apron **110**. Once the respective button is the depressed, the right hopper **106**, the left hopper **108** and/or the apron **110** may continue to move until a fully raised or fully lowered position is achieved. Hence, the operator may not be required to hold the button while the fully raised or fully lowered position is being achieved. Hence, the disclosed control system **500** with the auto mode may enable the operator to perform other tasks once the control system **500** actuates a particular operation; the operation is completed without the interference of the operator. The disclosed paving control system **500** may enhance productivity of the operator, and may also provide better ergonomics for the operator.

It should be understood that the above description is intended for illustrative purposes only and is not intended to limit the scope of the present disclosure in any way. Thus, those skilled in the art will appreciate that other aspects of the disclosure can be obtained from a study of the drawings, the disclosure, and the appended claim.

What is claimed is:

1. A paving machine comprising:

a right hopper configured to move in a vertically upward direction and a vertically downward direction from a first fully lowered position to a first fully raised position;

a left hopper configured to move in a vertically upward direction and a vertically downward direction from a second fully lowered position to a second fully raised position;

an apron configured to move in a vertically upward direction and a vertically downward direction from a third fully lowered position to a third fully raised position; and

an automated hopper and apron control system, wherein the automated hopper and apron control system is configured to control the movement of the right hopper, the left hopper, and the apron, the automated hopper and apron control system comprising:

a first operator control button associated with automatically raising the right hopper to a first fully raised position;

a second operator control button associated with automatically raising the left hopper to a second fully raised position;

a third operator control button associated with automatically raising the apron to a third fully raised position;

a fourth operator control button associated with automatically lowering the right hopper to a first fully lowered position;

a fifth operator control button associated with automatically lowering the left hopper to a second fully lowered position;

a sixth operator control button associated with automatically lowering the apron to a third fully lowered position; and

a controller in communication with the first operator control button, the second operator control button, the third operator control button, the fourth operator control button, the fifth operator control button, the sixth operator control button, the right hopper, the left hopper, and the apron, and configured to:

upon the actuation of the first operator control button, raise the right hopper to a first fully raised position;

upon the actuation of the second operator control button, raise the left hopper to a second fully raised position;

upon the actuation of the third operator control button, raise the apron to a third fully raised position;

upon the actuation of the fourth operator control button, lower the right hopper to a first fully lowered position;

upon the actuation of the fifth operator control button, lower the left hopper to a second fully lowered position; and

upon the actuation of the sixth operator control button, lower the apron to a third fully lowered position.

2. The paving machine of claim **1**, wherein as the controller raises the right hopper to a first fully raised position, upon actuation of the fourth operator control button the controller is further configured to:

stop raising the right hopper to a first fully raised position; and

lower the right hopper to a first fully lowered position.

3. The paving machine of claim 2, wherein as the controller lowers the right hopper to a first fully lowered position, upon actuation of the first operator control button the controller is further configured to:

stop lowering the right hopper to a first fully lowered position; and

raise the right hopper to a first fully raised position.

4. The paving machine of claim 3, wherein as the controller raises the left hopper to a second fully raised position, upon actuation of the fifth operator control button the controller is further configured to:

stop raising the left hopper to a second fully raised position; and

lower the left hopper to a second fully lowered position.

5. The paving machine of claim 4, wherein as the controller lowers the right hopper to a first fully lowered position, upon actuation of the second operator control button the controller is further configured to:

stop lowering the left hopper to a second fully lowered position; and

raise the left hopper to a second fully raised position.

6. The paving machine of claim 5, wherein as the controller raises the apron to a third fully raised position, upon actuation of the sixth operator control button the controller is further configured to:

stop raising the apron to a third fully raised position; and

lower the apron to a third fully lowered position.

7. The paving machine of claim 6, wherein as the controller lowers the right hopper to a first fully lowered position, upon actuation of the third operator control button the controller is further configured to:

stop lowering the apron to a third fully lowered position; and

raise the apron to a third fully raised position.

8. A paving machine comprising:

an apron configured to move in a vertically upward direction and a vertically downward direction from a fully lowered position to a fully raised position; and

an automated apron control system comprising:

a control signal; and

a controller; wherein when the controller receives the control signal, the controller moves the apron from a current position to a preset position.

9. The paving machine of claim 8, further comprising a sensor to measure the current position of the apron.

10. The paving machine of claim 8, wherein the preset position is the fully raised position.

11. The paving machine of claim 8, wherein the preset position is the fully lowered position.

12. The paving machine of claim 8, wherein the control signal is generated by an operator control button.

13. The paving machine of claim 9, wherein the controller moves the apron until the current position matches the preset position.

14. A paving machine comprising:

a right hopper configured to move between a first position and a second position;

a left hopper configured to move between a third position and a fourth position;

an apron configured to move between a fifth position and a sixth position; and

an automated hopper and apron control system, wherein the automated hopper and apron control system is configured to control the movement of the right hopper, the left hopper, and the apron; the automated hopper and apron control system comprising:

a control signal; and

a controller, wherein when the controller receives the control signal, the controller moves the apron from a current position to a preset position.

15. The paving machine of claim 14, further comprising a second control signal, wherein when the controller receives the second control signal, the controller moves the right hopper from a second current position to a second preset position.

16. The paving machine of claim 15, further comprising a third control signal, wherein when the controller receives the third control signal, the controller moves the left hopper from a third current position to a third preset position.

17. The paving machine of claim 14, wherein the preset position is the fifth position.

18. The paving machine of claim 14, wherein the preset position is the sixth position.

19. The paving machine of claim 14, wherein the preset position is between the fifth position and the sixth position.

20. The paving machine of claim 17, wherein the fifth position is when the apron is in a fully raised position.

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